For a listing of individual and/or organizations contacted by telephone, and/or copies of some of the transcripts from the telephone conversations, please refer to the EPA Public Docket Administrative Record AR-139.

Learnings from Phase II Research

Learnings from the NAHMMA Annual Meeting

During the NAHMMA annual meeting, the EPA held a session that gave an overview of the CLI and the storage and disposal issues involved in the Initiative. The session was opened to receive feedback from participants on storage and disposal labeling issues. The majority of people attending the session were already aware of many of the storage and disposal issues, and were, therefore, able to provide the EPA with well informed discussion and suggestions. Many of the people attending the session were more focused on the disposal of unused product than on disposal of containers. Attendees made several points:

- many states do not have statutes specifically addressing disposal of household pesticides, insecticides, and hard surface cleaners, and programs that do exist for these products vary widely across states and localities;

- instructions on labels such as “wrap in newspaper and throw in trash” are not appropriate. Commentators preferred language that instructs consumers to “use it up,” such as, “Only buy what you need,” then “Give what you have left over to someone else who will use it” and finally, “Bring any unused product to a HHW collection facility or event”; and

- for consumers to obtain correct disposal information for HHWs, it is not enough to simply have language on a label instructing them to “call your local waste management agency,” because many people would not know whom to call. Instead, several people suggested that a national toll-free number giving consumers information about disposal requirements in their local communities may be a better option.

Information from NAHMMA Mailing

The mailing to NAHMMA members had a low response rate. Of the 300 members who received the mailing, only 13 states and localities, representing 12 states, responded. The organizations that responded were:

- West Central Indiana Solid Waste District (Indiana);

- State of New Mexico Environment Department, Solid Waste Bureau (New Mexico);

- Minnesota Pollution Control Agency, Hazardous Waste Division (Minnesota);

- Minnesota Department of Agriculture (Minnesota);

- Walla Walla County Regional Planning Department, Recycling and Waste Management Division (Washington);
- Oregon Department of Environmental Quality, Household Hazardous Waste, Solid Waste Policy and Program Development Section (Oregon);
- Wisconsin Department of Agriculture, Trade and Consumer Protection Department (Wisconsin);
- Texas Natural Resources Conservation Commission, Clean Texas 2000/Household Hazardous Waste Management (Texas);
- City of Lawrence, Waste Reduction and Recycling Division (Kansas);
- Sonoma County, Household Hazardous Waste Program and Sonoma County Waste Management Agency (California);
- Michigan Department of Environmental Quality, Waste Management Division (Michigan);
- New York Department of Environmental Conservation, Division of Solid and Hazardous Materials (New York); and
- Vermont Department of Environmental Conservation, Agency for Natural Resources (Vermont).

Regulations, policies, and programs pertaining to disposal of household pesticides, insecticides, and hard surface cleaners vary greatly, both among *and within* the states and localities that responded to the mailing. Most of the states and local authorities that responded classify the three product categories as HHW. According to respondents, in most states it is up to local governments to regulate disposal of these types of wastes. It is important to note, however, that many respondents did not distinguish between disposal of *unused product* and disposal of *empty containers*.

State and Local Requirements, Policies, and Programs for Disposal of Unused Pesticide and Hard Surface Cleaner Product and Containers

In many of the states that responded to the mailing, consumers are generally encouraged, but not required, to bring their unused pesticide or hard surface cleaner products and containers to local HHW collection events or facilities. Some states that responded, however, have either statewide and/or local HHW management programs as part of their *state* hazardous waste management plans[1]. (HHWs are exempt from federal hazardous waste regulations under Subtitle C of the Resource Conservation and Recovery Act (RCRA)). Minnesota, for example, has a statewide hazardous waste management plan that includes a mandatory HHW management program, and requires every region in the state (a region may contain anywhere from two to ten counties) to have a permanent HHW collection facility. Consumers are encouraged to participate in the state's HHW programs but are not required to; they do not face any penalties if they do not participate.

[1] For a complete list of all states with HHW programs, refer to discussion of the WWC report.

Minnesota has some of the most established and extensive regulations regarding disposal of unused pesticides and hard surface cleaners, as well as empty containers. Currently, there are 41 permanent HHW collection facilities in the state (Waste Watch Center, 1998). Consumers are urged to buy products only in quantities they think they will need and to use up as much of the product as possible, or give it away to someone else who can use it. In the case of unused pesticides, consumers are then encouraged to take them to a local HHW collection facility or event. As part of the state HHW program, Minnesota has an extensive consumer education program, which provides detailed information for consumers on the best ways to store and dispose of their unused pesticide and household cleaner products and containers.

The West Central Indiana Solid Waste District was one of the few states that made a distinction between how they handle empty containers and unused product. For example, Indiana's State Chemist's office has a program for recycling empty pesticide containers into plastic lumber. Unused pesticide and hard surface cleaner product can be taken to collection centers operated by solid waste districts, which either have permanent collection facilities or one-day collection events.

Vermont handles pesticides and hard surface cleaners somewhat differently than the other states that responded to the NAHMMA mailing. Vermont's pesticide regulations distinguish between household, agricultural, and commercial pesticides on the basis of the materials themselves, rather than on the basis of who uses them. All pesticides are subject to the Vermont Department of Agriculture, Food and Markets (DAF&M) regulations. These regulations state that "obsolete, excess, and mixtures of pesticides" have to be disposed of in accordance with Vermont's Hazardous Waste Management Regulations (which follow RCRA Subtitle C regulations). The DAF&M regulations for pesticide containers state that "disposal of pesticide containers shall comply with instructions on the labeling and with other state and federal regulations."

Finally, some states, including Texas and Wisconsin, which have statewide collection programs for *agricultural* pesticides, will accept HHWs in their collections if the agricultural collection program has funds remaining. Alternatively, remaining funds and/or grants may be made available to local governments to help them establish HHW collection programs or annual collection events.

State and Local Requirements, Policies, and Programs for Recycling of Pesticide and Hard Surface Cleaner Containers

The majority of the thirteen organizations that responded to the mailing said that they did not have specific statewide regulations pertaining to recycling of pesticide and hard surface cleaner containers. Because the vast majority of recycling programs are operated by municipal governments that must coordinate with local waste hauling companies, it is up to the company and the local government to decide what materials can and cannot be recycled. Market forces primarily determine what materials end up being recycled. If a recycling company can cost-effectively recycle a specific material, they will be more willing to collect it. For example, in most states, certain "clean" plastics (i.e., plastics #1 and #2) are accepted for recycling; hard surface cleaner containers made of these types of plastics are usually accepted by recycling programs. Acceptance of aerosol containers containing hard surface cleaners for recycling, however, is uneven. It is usually left up to the discretion of the waste haulers to decide if it is economical for them to collect these containers.

According to respondents, since pesticide containers (plastic and aerosol) may contain some residual chemicals, they may be considered to be hazardous wastes in some localities. Consequently, these containers may not be permitted in the local recycling stream or may not be collected by the local waste hauler. According to respondents, this exclusion occurs primarily because residual chemicals may increase the likelihood of contamination of other recyclable materials. Respondents noted that in some cases, waste haulers in their areas are reluctant to collect pesticide containers, because the cost of decontaminating their collection bailer far outweighs the benefits of collecting these types of containers. In most of the states that responded to the mailing, consumers are instructed to follow the directions on the product label for disposal instructions.

State and Local Requirements, Policies, and Programs for the Recycling of Aerosol Containers

Recycling of aerosol containers (usually cans) varies from state to state and from locality to locality. In all 12 states that responded to the NAHMMA mailing, consumers are asked to empty their aerosol cans prior to recycling or disposing. (Containers can be emptied either at a local HHW collection facility or event, or by making sure that all of the product is used up.) Acceptability of aerosol cans, either at recycling centers or through curbside programs, largely depends on the recycler's locality and whether the local recycling company will accept the material. Some waste haulers are reluctant to collect aerosol cans because they say that it is difficult to determine if the can is completely empty or completely de-pressurized, and waste haulers say that this can lead to contamination and/or fire hazards for other recyclable materials. Acceptability of aerosol cans for recycling often also depends on the contents of the can. In most states, aerosol cans that contained pesticides are usually not accepted for recycling (because of potential contamination and fire hazards). It should be noted, however, that the EPA's PR notice 94-2 authorizes recycling of empty aerosol pesticide containers. In terms of aerosol cans that contained hard surface cleaners, however, it is up to the local recycling program to decide whether it will accept these cans.

The CSMA and HIPIC countered the argument that there are risks associated with aerosol recycling, as many waste haulers stated, with data showing the growth in aerosol recycling in the U.S. The presentation was given to the EPA in conjunction with other presentations made by members of CSMA and HIPIC in May 1998. (See discussion below).

Consumer Participation or Reaction to Local Hazardous Waste Pick-up Days or Amnesty Programs

Many of the respondents did not distinguish between participation rates for pesticides or hard surface cleaners and all other hazardous wastes, most likely because this information is not tracked separately by product type. In some states, information on overall consumer participation in pick-up/amnesty days is not tracked at all. In most of the states that responded to the NAHMMA mailing, consumer participation in hazardous waste pick-up days or amnesty programs was reported to be "quite high." Most states reported an average participation rate of between 3% and 5% of the population (i.e., local population). Although the percent of the total population participating in these programs may seem low, HHW program managers say that participation is "quite high" because the need for pick-up days and/or amnesty programs may not

be continuous; i.e., when an event such as this occurs the participation rate is high, but may seem low when averaged over the entire population.

Consumer Participation or Reaction to Recycling Programs for Empty Aerosol or Plastic Containers

Consumer participation in recycling programs for aerosol and plastic containers is mixed. Many states do not break down data on consumer participation or reaction to recycling programs according to the materials recycled. A few states indicated that participation/reaction to recycling programs for plastic containers tends to be higher and more positive than that for aerosol cans. According to these respondents, this difference occurs primarily because consumers are familiar with recycling plastics, whereas recycling of aerosol cans is still a relatively new idea in many communities.

Common Practices for Storage of Pesticide and Hard Surface Cleaners

Most of the 12 states that responded to the mailing indicated that they do not have specific requirements or policies for storage of household pesticides, insecticides, and hard surface cleaners, aside from the label instruction that says to "Keep out of reach of children." Minnesota does, however, provide consumers with a flier on storage and use of general household chemicals. In states that have established regulations for agricultural pesticides, there are stringent regulations for the storage of these types of pesticides. For example, in Vermont, no distinction is made between household and agricultural pesticides, and, therefore, household pesticides must be stored in accordance with agricultural pesticide regulations. The regulations state that these products must be stored so as to avoid leakage, and to make sure that pesticide containers are resistant to corrosion, leakage, puncture, or cracking.

Chemical Specialties Manufacturers Association (CSMA) and Household and Institutional Products Information Council (HIPIC) Members' Presentations

The CSMA and HIPIC members' presentations began with a discussion of several risk assessment studies. Risk assessment estimates the potential for toxicity of chemicals to humans or harm to the environment. Conducting a risk assessment includes: hazard identification, dose-response assessments, exposure assessments, and risk or outcome characterization. In most cases, toxicity risk to humans or harm to the environment is determined by hazard identification and an evaluation of dose-response relationships; determining whether there is a *hazard* to humans is often dependent on whether a dose-response relationship exists (Kimmel et al., 1990). A dose-response relationship compares the actual concentration of toxic materials in the environment with either the no-observed-effect-level (NOEL) and/or the lowest-observed-effect-level (LOEL). The NOEL is the highest dose that can be given without any effects being observed. The no-observed-effect-concentration (NOEC) is the highest concentration of toxic material in the environment that does not cause an adverse effect to the environment and the surrounding communities. The actual concentration of materials, sometimes referred to as the predicted environmental concentration (PEC), is then compared to the NOEC to determine if the concentration of materials in the environment may be potentially harmful.

Several methodologies may be used to assess the environmental fate of a chemical. The most common is mathematical modeling of the fate and transport of the chemical in the environment. Other methods include chemical analysis, either through laboratory simulations of "real-world" situations, or through representative environmental samples (RES) (long-term monitoring of the environment). These last two methods are used less frequently due to the immense costs involved.

Several factors are taken into consideration to determine the PEC. First, characterization of the chemicals themselves and information on potential emissions is made. Additionally, a pathway analysis (i.e., the most likely pathway, either air, water, or soil,) for the emissions is determined. Finally, assessment of the endpoint for the chemicals is conducted. Emissions estimates and physical and chemical data feed into an assessment of the fate of the chemical(s) in the environment. This is what is used to determine the PEC. If the ratio between the PEC and the NOEC is less than or equal to one, then it is safe to dispose of the chemical in the environment in the quantities estimated. Generally, for acute effects a safety factor is included. If the ratio is greater than or equal to one, then the concentration of chemical in the environment may cause potential harm to the environment.

Environmental Risk Assessment of Consumer Products: Introduction and Evaluation of Publicly Owned Treatment Works (POTWs)

The Procter and Gamble Company (P&G) presented the findings from an environmental risk assessment of disposing consumer products (such as household cleaning products) to publicly owned treatment works (POTWs). P&G's risk assessment study utilized a mathematical model and laboratory data. The model looked at the disposal of household products typically designed for "down the drain" use, for the entire U.S. population that is connected to POTWs (about 75%). P&G pointed out that products are formulations of different chemicals (e.g., active ingredients, carriers, and additives), and each of these components has a particular fate in the environment. P&G's model assumed both a typical disposal of the product consisting of release of the product to the sewage system during normal use of the product, as well as a worst-case scenario in which the entire product is dumped down the drain.

The model examined what the effects to a POTW's functionality would be if excess amounts of major domestic detergent surfactants used in household products, perborate (bleach), or quaternary ammonium chloride compounds were put down the drain. To determine the effects on a POTW, the efficiency of aerobic and anaerobic functions of the microbes responsible for waste removal in POTWs was studied. From these studies P&G determined that none of the products, in the amounts tested, would have a negative effect on the functionality of a POTW. Thus, P&G concluded that POTWs are capable of handling household consumer products, even in worst-case situations.

Septic Systems — Product Use and Disposal

The second presentation was made by The Clorox Company (Clorox), a leading manufacturer of household cleaning products. Clorox described why studying septic systems is important (approximately 25% of the U.S. population uses septic systems to treat their wastewater), and how down-the-drain products are tested and evaluated to determine the products' impact on septic systems.

The presentation began with a brief overview of how septic systems operate and a description of the test procedures used to measure the impact of down-the-drain products on a septic system. Septic tank compatibility of down-the-drain products is determined by evaluating microbial toxicity, sludge setting, and the biodegradation/removal potential. In addition, there are laboratory mini-septic systems that monitor coliform count, pH, chemical and biological oxygen demand and wastewater flow rates. The results of these tests are used to develop no-observed-effect-concentrations (NOEC). Information on consumer use habits and packaging size allows for developing a Predicted Environmental Concentration (PEC). The NOEC is compared to the PEC. The greater the NOEC/PEC ratio, the greater the safety margin. As the safety margin increases, the risk associated with adverse effects decreases.

Clorox presented a hypothetical example of consumer normal use (1/4 cup/gallon; 1-5 times per week), heavy use (½ cup/gallon; 8 times per week), and worst-case misuse (1 gallon; largest container) of a down-the-drain product. Based on the above consumer use patterns, the PEC is: normal use — 21 to 105 milligrams per liter (mg/liter); heavy use — 335 mg/liter; and worst case — 1,335 mg/liter. Assume that test results indicate a NOEC of 2500 mg/liter. Then, even under the worst case scenario (consumer disposing entire content of largest container directly into septic tank), no adverse effects would be expected.

Clorox also presented screen test results that examined the effects of disposing copious amounts (i.e., 10-300 times normal use) of household ingredients into a septic system.

Environmental Risk Assessment: Municipal Solid Waste Landfills (MSWL)

The final presentation of risk assessment models was given by the Amway Corporation (Amway). Amway presented the findings of a risk assessment model that examined the effects of disposing household products to municipal solid waste landfills (MSWL). Amway presented a comprehensive model of the various stages of conducting a risk assessment of disposing household products to MSWL.

The first step is identifying the hazards and the risks of this type of disposal by determining the exposure compartments (e.g., hazards of raw material components, hazards of using the products, hazards during storage and disposal of the product) and the hazard identification (i.e., the toxicity, reactivity, flammability, and corrosivity of the products). Toxicity was chosen as the primary hazard because it is not necessarily mitigated by landfill dilution, as are the other hazard characteristics usually cited for municipal solid wastes. Also, toxicity could potentially aggregate in the leachate and should be accounted for using a rigorous risk assessment model as the one presented by Amway.

The second step assesses risk by identifying the various routes of product disposal (e.g., down the drain, through MSWL, recycling, composting, or special collections), and the various routes of exposure of the product (i.e., surface water, ground water, air, and direct contact).

The model tested the potential effects of disposal of household hazardous products on a RCRA "Subtitle D" MSWL, assuming a worst-case scenario (i.e., 100% emission to leachate and 100% emission to air). RCRA Subtitle D landfills have to comply with regulations concerning specified soil types, and be sited to avoid sensitive areas and seismic activities; the landfill must be equipped for venting of gases, and must meet specific liner requirements (usually double-lined). Finally,

leachate from these landfills must be monitored, and there must be continuous monitoring of the landfill liner to detect any failures.

Amway also presented several case studies, utilizing risk assessment models, in which the typical concentrations of household products such as, toilet bowl cleaners, glass cleaners, and bleach, disposed of to MSWL, were compared to the NOEC for these products in landfills. In almost all of the cases, it was found that these types of household products do not pose an adverse threat to the functionality of MSWL; RCRA Subtitle D landfills are capable of handling the concentrations of household products that consumers dispose into them.

Aerosol Containers Handled Through the Recycling and Solid Waste Streams

The CSMA and HIPIC made a presentation on the advantages of recycling empty aerosol containers. They pointed out that the majority of aerosol cans are made of recyclable steel, and that the majority of them are made with 25% or more recycled content. Steel is the most recycled commodity. It was pointed out that steel manufacturers have use for the high-quality steel from which aerosol cans are made. Recycling of empty aerosol cans benefits the environment and is economical. The CSMA and HIPIC pointed out that if all empty aerosol cans manufactured in the United States per year were recycled, there would be enough empty household residential aerosols to manufacture 160,000 cars. They also emphasized that steel recycling is energy efficient, stating that every pound of steel recycled saves 5,450 BTUs of energy, and that every ton of recycled steel saves 2,500 pounds of iron ore, 1,000 pounds of coal, and 40 pounds of limestone.

Data were also presented demonstrating the growth in empty household residential aerosol recycling. In the early 1990s, only one community recycled empty household residential aerosols, compared to 5,000 communities today that include aerosols in their recycling programs. Additionally, several states have issued statewide endorsements stating that they support and encourage the recycling of empty aerosol containers in their recycling programs. These states include Michigan, Wisconsin, Illinois, New Jersey, Ohio, Florida, North Carolina, Pennsylvania, Texas, and California. (The CSMA and HIPIC provided supporting letters from each of these states, highlighting their support for aerosol recycling in their state recycling programs.)

Finally, the CSMA and HIPIC presented data from a risk assessment study that was sponsored by the CSMA and conducted by the Factory Mutual Research Corporation (an independent fire engineering research group), which studied the risks of aerosol containers in Material Recycling Facilities (MRF). The study focused on the potential for release of container contents, the potential for ignition, and the potential for fire or explosion during the pre-bailing, bailing, and post-bailing stages. It was found that because of the operating conditions in MRFs, and in the bailers in particular (e.g., there is not much air circulation within the bailer itself, and therefore little likelihood of materials in the bailer igniting), the risks of these types of accidents were minimal and comparable to other risks in the facilities. The CSMA and HIPIC concluded their presentation with a brief overview of ways in which risks at MRFs that handle aerosol containers may be minimized. For example, one of the primary ways to reduce risk is through consumer education efforts that inform consumers to use up all of the product in the container and to place only empty aerosol containers in the recycling bin. Similarly, education of employees working at MRFs can help to minimize risks as they become more adept at handling loads that include some

of these containers. Finally, adding magnetic separation (so that only the empty cans are picked up) or ventilation to bailer operations can further decrease the chances of explosions or fires.

Trends in Household Insecticide Technology Relevant to Product Safety and Household Hazardous Waste (HHW) Considerations

S.C. Johnson and Son, Inc. (S.C. Johnson) presented data on recent trends in the household insecticide products (HIP) industry, as well as information regarding whether these products should be categorized as HHW. For purposes of this discussion, the focus was on insecticides used indoors (HIP); lawn and garden products were not considered. S.C. Johnson began by presenting summary data on the different types of products that make up the household insecticide product category.

Information on the trends in the active ingredients used in indoor insecticide spray products was presented. The data demonstrated that, over the past six decades, the trend in the types of active ingredients used in these products has been to eliminate the use of chemicals, such as chlorinated hydrocarbons (DDT and chlordane), and increase the use of synthetic pyrethroids and natural pyrethroids. Additionally, these "newer" active ingredients are more efficient, and are therefore typically used at significantly lower concentrations than their predecessors. Similarly, another trend in indoor insecticides has been to substitute water for organic solvents as the diluent in ready-to-use sprays. As an example, Raid™ Ant and Roach Killer, the leading product in this category, now has 60% water in its product formulation, whereas before 1995, this same product had no water in its formulation. This trend is consistent among other Raid™ products, with some products (Raid™ trigger products) containing as much as 97% water.

Additionally, natural and synthetic pyrethroids have much lower leachability potentials, and therefore less potential to contaminate groundwater sources. (Indoor insecticides may have potential for groundwater contamination through leaching of active ingredients through soil layers in and around landfills.) S.C. Johnson's research showed that the most commonly used active ingredients in household insecticides today (i.e., synthetic pyrethroids and certain active ingredients used in bait forms) are either too insoluble in water, or they tend to be too tightly bound to soil particles, to have any significant leaching potential to groundwater sources The exceptions to this are active ingredients such as diazinon and propoxur (Baygon), which are not often used in HIP these days, can be found in residual quantities in soils, and have some slight capacity to partition to soil water and move with the water.

To support these findings, S.C. Johnson presented data on certain physical/chemical parameters relevant to environmental fate for active ingredients used in HIP, and data from the EPA's Pesticide in Groundwater Database on detection of active ingredients used in insecticides in groundwater. These data are based on monitoring studies conducted between 1971 and 1991 throughout the U.S. The data showed that, with the exception of detections of insecticides in agricultural areas, concentrations of insecticide active ingredients typically did not exceed allowable maximum contaminant levels (MCL) set by the EPA.

Finally, S.C. Johnson pointed out that there have been recent shifts in the types of insecticides being used by consumers. Traditional sprays and foggers have been joined by, and to some degree replaced by, insecticides in forms such as baits that are sold in child-resistant plastic stations and non-chemical devices such as sticky tapes that trap insects. Additionally, research is

being conducted on the possibilities of efficient use and marketing of "bio-pesticides," though this category has not achieved significant marketplace success among HIP to date.

Given the data presented and the fact that household insecticide products as discussed have not always been considered to be "toxic" or "acutely toxic" under either RCRA or FIFRA regulations, S.C. Johnson offered the opinion that these types of pesticides should not be considered "household hazardous wastes," and they do not need to be diverted from municipal solid waste streams.

Waste Watch Center (WWC) Report on Household Hazardous Waste (HHW) Programs

The WWC provided the EPA with a listing of HHW programs in the United States, as of 1997. The data include both permanent and non-permanent HHW programs; farm and conditionally exempt small quantity generator waste; specialized programs, such as those that collect only paints, only farm pesticides, or only dry cell batteries; and curbside or special used oil collection programs. Waste Watch Center defined a HHW program as being permanent if the program had "at least monthly collections held at either a fixed site or at a dedicated mobile facility" (WWC, 1998). Since no central directory of HHW programs currently exists, WWC complied the data from various sources, including state and municipal information, project sponsor materials, personal contacts, and reporting forms.

In discussions regarding the data provided by WWC, the CLI Storage and Disposal Subgroup pointed out several limitations. For example, although the data provided comprehensive information on the number of HHW programs in the country, it did not provide population information, such as the number of people using these programs, or how many people are being served by each HHW program. Additionally, members of the Subgroup pointed out that participation in HHW programs is likely to be more erratic than, for example, a recycling program. This implies that participation in an HHW program may therefore not be as extensive as the WWC data suggest. One member of the Subgroup mentioned that in his locality, HHW collection events occur quite infrequently. Therefore, if a consumer missed a collection date, they would be more likely to place the HHW in the trash.

WWC's Data on HHW Programs

The WWC's data provided some key findings, presented below, broken down by the data on HHWs and information on policies, regulations, and programs at the state and local level:

- the number of HHW programs in the U.S. has steadily increased since 1980;
- the total number of HHW programs in the U.S., as of 1997, was 14,591;
- the total number of permanent HHW programs in the U.S., as of 1997, was 442 programs;
- every state in the U.S. has some type of HHW program;
- items that are collected by HHW programs include, but are not limited to: used paints, used motor oils, pesticide, cleaning products, household batteries,

fluorescent light bulbs, explosives, photochemicals, solvents, automotive parts, etc.;

- # California, Florida, Massachusetts, New Jersey, Minnesota, and Washington have the largest number of HHW programs — each of these states has over 500 HHW programs throughout the state; and

- # almost every state (except North Dakota, South Dakota, Nebraska, Louisiana, Mississippi, Georgia, West Virginia, and Maine) has at least one permanent HHW program, as defined by WWC.

The WWC compiled information from official records and documentation, as well as from conversations with experts in the field, about existing state and local official and un-official rules, regulations, policies, and practices that govern the disposal of HHWs. Some of the types of state, local, or regional regulations include the following:

- # defining as hazardous wastes all household wastes that contain hazardous substances. Some states, such as California, do not allow these types of wastes into the solid waste stream;

- # defining some products of wastes, which are solid wastes under RCRA, as hazardous;

- # having land bans that exclude certain hazardous products from landfills;

- # prohibiting certain hazardous wastes from being placed in the trash or brought to some solid waste companies or municipal solid waste (MSW) facilities (i.e., composting facilities and incinerators);

- # requiring that products containing certain hazardous substances be labeled to inform consumers that these products should not be placed in the trash;

- # requiring manufacturers to take back discarded products from consumers, so that local governments are relieved of paying for their disposal and/or recycling costs (e.g., in New Jersey); and

- # mandating that local recycling programs be established, and that these programs meet specific recycling targets. Collection of household hazardous products by these recycling programs may help communities meet these recycling goals.

In addition to the mandatory programs described above, several states and localities have established non-regulatory approaches for managing HHWs — or, at the very least, to prevent them from being placed in the trash or being dumped down the drain. Examples of these include:

- # establishing state funded and operated HHW collections at local and regional levels;

- # designating responsibility, often to the regional (rather than state) level government, to keep HHW and conditionally exempt small quantity generator (CESQG) wastes out of the solid waste stream;

- providing funding (e.g., in California, Vermont, Washington, Minnesota) to regional governments to develop a plan to manage HHW and CESQG wastes at the regional level;

- providing funding to local and regional governments to operate HHW collection days;

- providing funding to local and regional governments to establish permanent HHW collection facilities;

- establishing education programs in coordination with state, local, and regional HHW management programs;

- adopting the EPA's Universal Waste Rule;

- developing manuals and training courses for consumers on the best ways to dispose of their HHWs as part of HHW management plans;

- establishing product labeling requirements to help consumers identify products that contain hazardous substances; and

- providing consumers with information on alternative products that do not contain hazardous substances. Local governments have an interest in providing this information because they are the ones that bear the costs of managing HHWs in their waste streams.

Discussion Paper Evolving from the 1995 Cleaning Products Summit

Representatives from state and local organizations in the Storage and Disposal Subgroup provided a paper entitled "Concerns with Household Cleaning Products — A White Paper" to the Storage and Disposal Subgroup for its information and discussion. The Subgroup was never able to discuss the paper in detail, however. The paper was written in 1996 by Philip Dickey of the Washington Toxics Coalition (WTC) in collaboration with Dana Duxbury of the Waste Watch Center (WWC), David Galvin of the King County Local Hazardous Waste Management Program, Brian Johnson of the City of Santa Monica Environmental Programs Division, and Arthur Weissman of Green Seal. The paper discusses several issues relating to HHWs and to household cleaning products. The paper was provided to the Storage and Disposal Subgroup as a discussion paper to inform the Subgroup about:

- state and local agencies' concerns with current storage and disposal instructions on product labels, and to explain why state and local agencies advocate that labels instruct consumers to contact their local agencies for proper disposal instructions;

- to provide background on HHW programs; and

- to initiate discussion regarding the potential harmful effects of household cleaning products to the environment and to human health and safety.

The paper evolved from a meeting called the "Cleaning Products Summit" held in March 1995. The paper addresses concerns raised by both those who work with HHW programs and manufacturers of household cleaning products. In particular, it discusses the debate between these two groups about the definition of HHW and the types of products that should and should not be included in the definition. Manufacturers of household cleaning products argue that their products should not be included in HHW programs because they contain only "small concentrations of active ingredients" (Dickey et al., 1996, available in Administrative Record). Those who manage HHW programs argue that household cleaning products should be included in HHW programs because, even though concentrations of these ingredients may be low, the active and/or inert ingredients contained in these products may be hazardous.

The discussion below highlights some of the topics covered in the paper.

Purposes of Household Hazardous Waste Facilities and Programs

The paper begins with a discussion of the purposes of HHW programs. Manufacturers have argued that HHW programs have traditionally handled only HHWs as defined under the Resource Conservation and Recovery Act (RCRA). Consequently, these programs may not be as useful as they once were, because so few of today's household products end up as hazardous wastes as defined under RCRA. According to the authors, however, HHW programs continue to be useful and necessary because they do not simply collect wastes from households, but often are the main waste collectors for conditionally exempt small quantity generators (CESQG). As a result they often collect products, for example, janitorial cleaning agents, which are hazardous. Additionally, HHW programs collect wastes that have a hazardous component to them, regardless of the volume and concentration of these hazardous components, because the cumulative impacts of these chemicals may in fact have a significant impact on the environment and to human health and safety.

Dickey et al. also point out that HHW programs have increased their function beyond that of waste collection facilities. Many HHW programs have extensive consumer education programs that try to educate the public about issues other than disposal of products alone, including the proper storage and use of products, and their misuse, as well as pollution prevention and source reduction in general. In addition, the authors point out that the materials brought into a HHW facility (including household cleaning products, used motor oil, paints, pesticides, etc.), are not always seen as "waste." These products can often be used for other purposes; many HHW facilities are beginning to find ways to reuse and recycle the products brought into their facilities.

Definition of Household Hazardous Waste

There is a clear difference in how both HHW managers and manufacturers of household cleaning products define HHW. Household hazardous waste managers generally define HHWs as waste from residential sources that exhibits characteristics of hazardous wastes, such as: toxicity, corrosivity, ignitability, or reactivity. Manufacturers of household cleaning products, as represented by the Chemical Specialities Manufacturers Association (CSMA), define HHW as any "discarded household material which creates by itself or in conjunction with other household materials a verifiable level of toxicity that adversely affects health or the environment."

Dickey et al. point out that there is a clear distinction between the two definitions. First, the CSMA definition only considers the toxicity of a product and not any of the other characteristics

that hazardous wastes may exhibit. Also, they point out that unlike the CSMA definition, the definition used by HHW managers does not simply consider the adverse effects of HHW, but considers the *potential* dangers and/or risks of these wastes. Because of this difference in definitions, household cleaning products are considered HHWs by most HHW program managers, even though they may not be as hazardous as other materials collected by HHW programs (e.g., paints or used motor oil).

Effects of Household Cleaning Products

The paper also provides details about the health and environmental effects of ingredients found in cleaning products. In particular, the paper discusses information and data on the health effects of certain ingredients found in some cleaning products, such as skin/eye/lung irritation, inhalation problems, and carcinogenic effects. Dickey et al. also provide information and supporting data on the environmental effects that these ingredients can have when disposed of down the drain or in the trash. Examples include eutrophication of lakes, rivers, and estuaries; biodegradability and bioconcentration of the ingredients; the effects of heavy metals and organic compounds in household wastewaters; and the effects of volatile organic compound (VOC) emissions from these products.

Concerns Regarding Household Hazardous Wastes

The paper specifically addresses several concerns about HHWs, particularly cleaning products considered by managers of HHW programs to be HHWs. Occasionally, localities will perform "sorts" of their solid waste stream to assess what types of products are in the waste stream. According to several solid waste sorts, the average volume of HHW in the solid waste stream is between 0.3% and 0.5% by weight (from Systems, 1985 and Rathje, Wilson et al., 1987, in Dickey et al., 1996). Dickey et al. stress that even though these percentages are relatively small, they can amount to significant quantities when converted to actual volumes of waste. Additionally, even though these HHWs represent relatively small percentages of the total municipal solid waste stream, they contribute to the majority of the toxicity, corrosivity, and reactivity of the wastestream.

Hazardous chemicals found in household cleaning products can pose other real risks to the facilities and workers who handle these wastes. Hazardous wastes may leak out of trucks, loaders, and landfills. Chemicals may also react with other materials in the solid waste stream and cause acid or alkaline releases, as well as increase the risk of flammability. Workers who pick up household trash may be exposed to HHW chemicals that are mixed in with the municipal waste stream. Dickey et al. cite a California study done in 1982 which found that "3 percent of refuse collection workers in the state were injured due to contact with HHW" (California Solid Waste Board, 1984, in Dickey et al., 1996). Though national statistics for these types of incidents are rare, many local agencies are beginning to keep these types of statistics for their municipalities. They are also tracking the medical costs to localities arising from these kinds of injuries. In addition, many localities also state that the mitigation costs of chemical spills and exposures can be quite significant.

Managers of HHW programs have expressed serious concerns about the potential for explosions and damage to waste handling equipment that may result from reactions between HHW chemicals

or liquids and solid wastes. For this reason, HHWs are banned from the municipal solid waste stream in many localities.

Dickey et al. refute the household cleaning product and household pesticide manufacturers' conclusion that disposal of their products in the trash or down the drain does not present any significant adverse effects to municipal landfills. Dickey et al. contend that these conclusions are based on studies of RCRA Subtitle D landfills, which are required to have a double lining at their base to prevent leachate from leaking into groundwater (See CSMA and HIPIC discussion above). The authors add, however, that a large proportion of landfills in the U.S. were built prior to this requirement, and may therefore pose a risk of leaching into nearby groundwater. According to the paper, studies have shown that, in some cases, HHW chemicals have been found in these leachates and can be quite harmful (e.g., lead or mercury). Municipalities are now finding themselves in the position of having to pay for huge clean-up of these older landfill sites. The authors also cite studies that show that the lining in current landfills may eventually wear down and increase the chances of landfill leachates seeping into groundwater systems (LaPage and Winton, 1994, in Dickey et al., 1996).

The paper concludes by recognizing that all products have environmental impacts. Dickey et al. encourage product manufacturers to take these impacts, however minor, into consideration. They suggest that manufacturers can do this by practicing resource conservation and pollution prevention, and by eliminating the use of chemicals (e.g., dioxin and its precursors) in their products that are known to be harmful to human health and the environment.

Findings from Telephone Conversations

Several phone calls were made to individuals knowledgeable about HHW management. Calls were placed to trade associations such as the Steel Recycling Institute, the National Association for Plastic Container Recovery, the Solid Waste Association of North America, and the American Plastics Council. Calls were also placed to a few HHW management programs, including those in Missouri, Nebraska, and Washington state.

Many of the people contacted had information on regulations, policies, and programs regarding *disposal of containers*, but were less able to provide detailed information on regulations, policies, and programs regarding *storage and disposal* of *unused product*. Many thought that, in general, consumers would likely have to dispose of unused product at permanent or mobile collection facilities or events. Several people stated that California and Minnesota were the only states, to their knowledge, that mandated that unused HHW products be disposed of at local collection facilities.

The Steel Recycling Institute provided information about the recycling of aerosol cans. According to SRI, there are 4,500 municipal locations, serving over one hundred million people, that include aerosols in their recycling programs. SRI often works with local governments on their recycling programs and provides guidance on how steel recycling can be incorporated into their recycling stream. In many localities recycling of aerosol cans is a relatively new concept. Through its brochures and other literature, SRI provides guidance for proper disposal of aerosol cans and their contents. Consumers are instructed to make sure that aerosol cans are completely empty before they can be recycled (either at the curbside or through a recycling center) in areas where cans are accepted into the recycling stream. Additionally, SRI instructs customers to take

aerosol cans, which are either not empty or too old and rusty for the contents to be used up, to special collection centers or events in their local communities, rather than recycling the can.